DOCUMENT RESUME

ED 469 147 EF 006 146

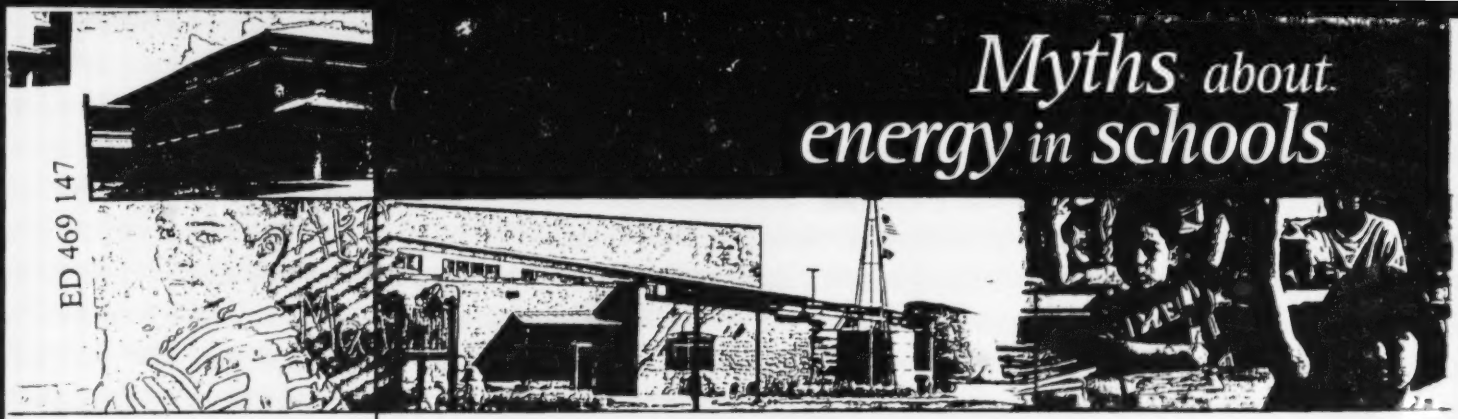
TITLE	Myths about Energy in Schools.
INSTITUTION	Department of Energy, Washington, DC. Office of Energy Efficiency and Renewable Energy.
REPORT NO	DOE/GO-102002-1525
PUB DATE	2002-02-00
NOTE	7p.
AVAILABLE FROM	For full text: http://www.eren.doe.gov/energysmartschools/pdfs/31607.pdf.
PUB TYPE	Reports - Descriptive (141)
EDRS PRICE	EDRS Price MF01/PC01 Plus Postage.
DESCRIPTORS	Academic Achievement; Building Operation; Elementary Secondary Education; Energy Conservation; *Energy Management; Lighting Design; *Misconceptions; Operating Expenses; *School Buildings

ABSTRACT

This publication from the EnergySmart Schools initiative, a program that focuses on improving communities nationwide through energy-saving solutions, examines some myths and misconceptions about energy in schools and provides facts that can help school districts make smarter energy choices. The myths discussed are: (1) energy isn't a major budget item for schools; (2) schools can't save much by being energy smart; (3) energy efficiency is unrelated to student performance; (4) energy improvements in existing buildings require major upfront investments; (5) new schools are energy efficient; (6) constructing an energy efficient school costs more; (7) designing energy efficient buildings takes more time; (8) tracking energy use isn't necessary; (9) local communities won't support energy improvements; and (10) help is hard to find. (EV)

Reproductions supplied by EDRS are the best that can be made
from the original document.

ED 469 147



Myths about energy in schools

Fact: Our schools spend more than $6 billion a year on energy. Most schools could save 25 percent of these high costs by being smart about energy.

1 Energy isn't a major budget item for schools.

2 Schools can't save much by being energy smart.

3 Energy efficiency is not related to student performance.

4 Energy improvements in existing buildings require major upfront investments.

Fact: Energy improvements have the potential to save our nation's schools $1.5 billion each year and, at the same time, create better learning environments.

5 New schools are energy efficient.

6 Constructing an energy-efficient school costs more.

7 Designing energy-efficient buildings takes more time.

8 Tracking energy use isn't necessary.

9 Local communities won't support energy improvements.

10 Help is hard to find.

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)
☑ This document has been reproduced as received from the person or organization originating it.
☐ Minor changes have been made to improve reproduction quality.
• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

EF 006 146

EnergySmart Schools
Rebuild America Schools
U.S. Department of Energy

BEST COPY AVAILABLE

Turn the page to get the facts about energy in schools.

Full text available at:
http://www.eren.doe.gov/energysmartschools/pdfs/31607.pdf

The View from Grandview, Missouri

In the Grandview school district's 1998/99 budget, utilities represented the largest area of expenditure after personnel. No other single category in the operating budget commanded as much money. While figures may vary from district to district—depending on size, number of students and facilities, State and local reporting requirements, and other factors—many districts, like Grandview, spend more on utilities than they do on textbooks.

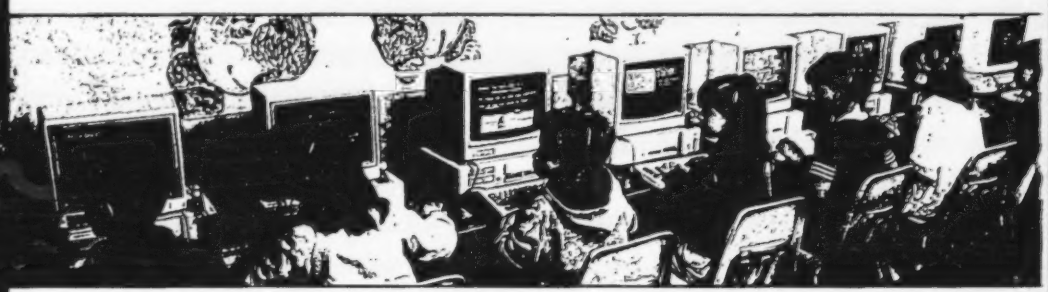
1998/99 Grandview Expenditures

Like many school districts, Grandview spends more on utilities than on textbooks.

Myth 1: Energy isn't a major budget item for schools

Fact: Not so. In many school districts, energy costs are second only to salaries, exceeding the cost of supplies and books. Nationally, K-12 schools spend more than $6 billion a year on energy and, according to the U.S. Department of Energy, at least a quarter of that could be saved through smarter energy management. Energy improvements could cut the nation's school bill by $1.5 billion each year.

There are a wide range of ways to improve existing buildings and build smarter new schools. One example, daylighting, is a particularly cost-effective option. According to the Sustainable Buildings Industry Council in Washington D.C., the average middle school that incorporates daylighting will likely save tens of thousands of dollars annually—and improve student performance at no extra cost.



Myth 2: Schools can't save much by being energy smart

Fact: Not so. Changes in behavior alone—such as turning off lights in unoccupied rooms and turning off computers at night and on weekends—can save an individual school thousands of dollars every year. Even vending machine lights can make a difference: Seattle School District saved $20,000 a year by turning off the lights in its 250 vending machines. The Green Schools program, managed by the Alliance to Save Energy, has helped cut the energy bills of 15 pilot schools by an average of $7,700 annually. Many of these schools realized savings simply by improving building operation and changing everyday behavior. The changes weren't hard or complicated—mostly common sense.

In addition to making behavioral and operational changes, many schools have reaped tremendous benefits by incorporating energy-efficient equipment and undertaking energy retrofits. For the Oquirrh Hills Elementary School in Utah, energy-saving features have saved $22,521 in electrical and natural gas bills. Daniel Boone High School in Washington County, Tennessee, has achieved a 34 percent reduction in annual energy costs since 1995 when it installed a geothermal heating and cooling system. The school has realized average annual savings of $82,000 as well as reduced maintenance needs, improved air quality, and better control of individual classroom temperatures.

BEST COPY AVAILABLE

Myth 3: Energy efficiency is unrelated to student performance

Fact: **Not so.** Evidence is growing that energy-efficient schools can provide learning environments that lead to improved student performance. In part, the link between smart energy use and improved learning is intuitive. If lighting quality is poor, students can't read the blackboard; they can't hear teachers over noise through leaky walls and windows; and they can't concentrate if they're roasting or freezing in classrooms with poor temperature control.

In addition, studies have shown that daylighting—an integral part of most new energy-efficient schools—may have a positive effect on student attitudes and performance. One study by Innovative Design, an architectural firm in Raleigh, North Carolina, concluded that students attending daylit schools for two or more years scored 14 percent better on tests than students in non-daylit schools.

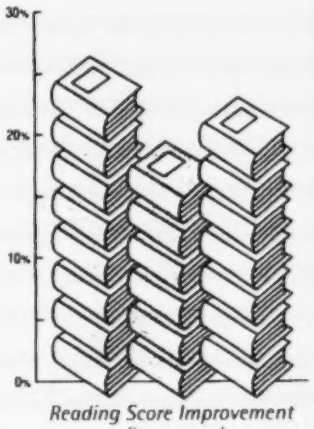
Myth 4: Energy improvements in existing buildings require major upfront investments

Fact: **Not so.** Fortunately, financing options such as energy savings performance contracts and lease-purchase programs allow schools to make improvements with little or no investment. With performance contracts, an energy services company (ESCO) pays for the energy improvements, and is paid back over time through the utility bill savings the project creates. The National Association of Energy Service Companies (NAESCO) has a list of qualified ESCOs (see www.NAESCO.org for more information). To ensure that an ESCO provides the best mix of energy measures, get an outside expert to review its proposal. Some companies provide this service for free or at a low cost for schools.

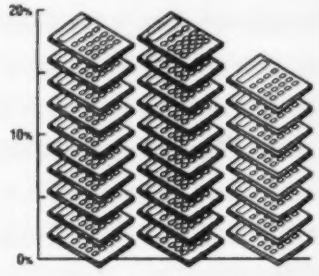
With lease-purchase programs, schools make payments each month and own the equipment at the end of the contract period. This is an increasingly popular approach for schools engaged in building improvements as well as bus purchases.

Many districts are taking advantage of these types of financing options. For example, the Duxbury, Massachusetts, School District joined forces with an energy service company, NORESCO, to design and build an energy-efficient retrofit that also addressed a serious indoor air quality problem. The resulting $2.7 million project, financed by a third party brought in by NORESCO, is being paid for by the school district under a 10-year shared savings contract. During the 10-year contract period, NORESCO guarantees Duxbury an energy cost savings of $271,900 per year, provides ongoing maintenance, and measures the school district's energy use to verify continued savings.

Daylighting Linked to Improved Test Scores



Reading Score Improvement (in one year)



Math Score Improvement (in one year)

Windows
Daylighting
Skylights

A 1999 study by energy consulting firm Heschong Mahone Group revealed a correlation between the use of daylighting and improved student performance. In the Capistrano school district in California, students in classrooms featuring daylighting strategies, large windows, or a well-designed skylight performed 19 to 26 percent better on standardized reading tests than students in classrooms without these features. Capistrano students performed 15 to 20 percent better on standardized math tests.

Myth 5: New schools are energy efficient

Fact: Not so. Unfortunately, this often isn't the case. Unless a school directs its architect to design energy-efficient buildings, new schools may be as inefficient as old ones. Or they may incorporate only modest energy efficiency measures. Well-designed schools are properly oriented on their sites to take maximum advantage (or provide relief from) the sun. They use windows, walls, lighting systems, heating and cooling systems, and other elements that are efficient and well-integrated. And they allow areas of the building to be shut down when not in use, among other energy-smart features.

During the rush to construct new buildings, schools often focus on short-term construction costs instead of long-term, life-cycle savings. The key to getting an energy-smart and well-designed school is to ask for an energy-efficient design in your request for proposals (RFP). And schools need to select architects who are experienced in making sure that energy considerations are fully addressed in design and construction.

Myth 6: Constructing an energy efficient school costs more

Fact: Not so. Total construction costs for energy-efficient schools are often the same as costs for traditional schools, even though individual building features may cost more. The reason is simple: efficient buildings leak less air and take better advantage of the local climate. Therefore, their heating and cooling systems–among the most expensive aspects of buildings–don't need to be as extensive to provide comfort. In many cases, schools can pay the same price to construct an efficient building and pay much less to operate it year after year after year. And even when construction costs are higher, energy savings can pay for additional upfront costs very quickly–sometimes in less than a year.

The energy-efficient design for Durant Road Middle School in Raleigh, North Carolina, resulted in reduced construction costs as well as reduced operating costs. Not only does this school save tens of thousands of dollars in energy costs each year, but the decision to decrease the size of the cooling and electrical systems saved $115,000 in construction costs in 1996. Daylighting–combined with a radiant barrier on the roof that reflects the sun's heat–lessens the cooling load about 30 percent below that of a conventional school.

Photo: Robert Flynn

The cost of adding daylighting components to the design for Durant Road Middle School in Raleigh, North Carolina, was in large part offset by cooling and lighting load reductions—reductions made possible by the daylighting and building shell efficiency measures incorporated.

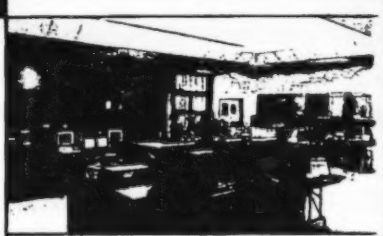
BEST COPY AVAILABLE

Myth 7: Designing energy-efficient buildings takes more time

Fact: **Not so.** The design process for an energy-efficient building is slightly different but not necessarily more time consuming. The process is less linear–design documents don't just go from architect to engineer to subcontractors, with each adding information at a specific stage. Instead, all of these professionals work closely together from the beginning to ensure that the building's systems are fully integrated with each other and with the structure.

Check out the back cover for more Myths and Facts about energy in schools.

Daylighting strategies at Clayton Middle School in Johnston County, North Carolina (left and below), save money by reducing electric lighting needs as well as heating and cooling loads. The use of daylighting has also been connected to increased attendance and improved academic performance.



"Energy isn't a major budget item for schools." This statement is one of a number of myths about energy in schools. The fact is that in many school districts, energy costs are second only to salaries, and exceed the cost of supplies and books.

The following pages take a look at some of the myths and misconceptions about energy in schools, and provide the facts that can help school districts make smart energy choices. Around the country, many school districts are already proving that energy-smart building choices can significantly reduce their operating costs and, at the same time, create better places to teach and learn.

Myth 8: Tracking energy use isn't necessary

Fact: Not so. As school administrators in Utah found out, understanding how energy is used can help schools identify energy waste and equipment problems, as well as overcharges and errors on energy bills. Through careful tracking, five Utah school districts uncovered thousands of dollars in utility overcharges. In 1997, Jordan School District uncovered $93,000 in credits for one high school alone.

Once school personnel know their buildings' energy consumption rate, school districts can provide incentives for reducing consumption through tracking. Careful monitoring of school energy use led Philadelphia's school district to cut its utility costs nearly $7 million annually for the past seven years. These savings are reinvested in educational or recreational programs in each school.

Myth 9: Local communities won't support energy improvements

Fact: Not so. Energy-efficient design for schools can be a selling point in bond elections because energy improvements translate to more comfortable classrooms for students, reduced energy bills, and lower operating and maintenance costs. Communities across the country have recognized the benefits of energy-wise design. In Montpelier, Vermont, for example, more than 300 volunteers from the community supplied labor to construct two new classrooms with natural daylighting, good ventilation, and energy-efficient design to create a positive learning environment.

Myth 10: Help is hard to find

Fact: Not so. Help is available through programs at the national, state, and local level. State energy offices provide technical assistance and grant programs. Utilities and energy service companies provide expertise and resources to reduce energy consumption. These resources range from financing for new construction and retrofits to technical assistance and instructional materials on energy.

More and more school districts are finding ways to utilize resources from the business community as well. Under Michigan's SolarSchools program, for example, six Detroit Edison commercial customers are partnering with ten southeastern Michigan school districts. Each participating school receives an annual credit toward its electric bill of 2,000 kilowatt-hours of electricity from a solar electric facility. The credits are donated to the schools by their business partners. In addition, Detroit Edison developed curricula on solar and renewables for grades 4-6.

For more information and ideas to help your district take strategic advantage of available resources, visit the EnergySmart Schools website at www.energysmartschools.gov or call the Energy Efficiency and Renewable Energy Clearinghouse at 1-800-DOE-3732 for tools and support available from DOE.

To Learn More

To learn more about myths and facts related to energy in schools, visit the EnergySmart Schools website at www.energysmartschools.gov or call 1-800-DOE-3732.

EnergySmart Schools is part of Rebuild America, a U.S. Department of Energy program that focuses on improving communities nationwide through energy-saving solutions. EnergySmart Schools serves as a catalyst to leverage public and private resources to develop and support schools that incorporate energy-smart building designs and improvements.

EnergySmart Schools not only works with school districts to introduce energy-saving improvements to the physical environment, it also takes a proactive role in promoting energy education in our schools. Rebuild America and EnergySmart Schools offer free technical assistance and training, as well as contacts in other communities who have already built or renovated using smart energy concepts.

U.S. Department of Energy
Office of Building Technology, State and Community Programs
Office of Energy Efficiency and Renewable Energy

February 2002 DOE/GO-102002-1525

U.S. Department of Education
Office of Educational Research and Improvement (OERI)
National Library of Education (NLE)
Educational Resources Information Center (ERIC)

NOTICE

Reproduction Basis

[ ] This document is covered by a signed "Reproduction Release (Blanket)" form (on file within the ERIC system), encompassing all or classes of documents from its source organization and, therefore, does not require a "Specific Document" Release form.

[X] This document is Federally-funded, or carries its own permission to reproduce, or is otherwise in the public domain and, therefore, may be reproduced by ERIC without a signed Reproduction Release form (either "Specific Document" or "Blanket").